

AA1602

**CLAIMS:**

1. An exhaust system for a lean-burn internal combustion engine comprising a soot filter packed with a mass of elongate flat, narrow strip metal and a catalyst located upstream of the filter for oxidising NO to NO<sub>2</sub> for combusting soot collected on the filter in NO<sub>2</sub>, wherein the catalyst is supported on a metal substrate of the type used in the filter, but at a lower packing density, to permit passage of soot particles.
2. A system according to claim 1, comprising an exhaust gas treatment system comprising, in order from upstream to downstream, a plurality of metal-based filters adapted to successively trap smaller and smaller particles.
3. A system according to claim 2, comprising at least one wall flow filter for trapping yet smaller particles.
4. A system according to claim 2 or 3, comprising a flow-through monolith between the or each pair of metal-based filters.
5. A system according to claim 4, wherein the or each flow-through monolith comprises a NO oxidation catalyst, whereby to restore the NO<sub>2</sub> content, which had been decreased by reaction with soot in the preceding filter.
6. A system according to any preceding claim, wherein the filter capacity is sufficient to allow the soot to be combusted continuously by the oxidant.
7. A system according to any preceding claim wherein the filter capacity is sized for accumulations of soot sufficient to increase pressure-drop significantly before the next period of fast running and the system includes a bypass the pressure-drop through which is equal to the design maximum tolerated pressure-drop through the filter(s) whereby to avoid engine stalling.

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8. A system according to claim 7, comprising means to limit soot emission to atmosphere, which means comprising a second stage such as a filter or impingement collector and/or an oxidation catalyst downstream of the bypass.
9. A system according to any preceding claim, wherein the filter has, wholly or domain-wise, a regular coiled, woven or knitted structure.
10. A system according to any preceding claim, wherein the metal of the filter is Type 300 or Type 400 stainless steel.
11. A system according to any preceding claim, wherein the metal of the filter comprises an iron alloy containing at least 11.5% Cr, 4% Al and 0.02-0.25% minor constituents such as rare earth, zirconium or hafnium.
12. A system according to any preceding claim, wherein the width of the metal strip of the filter is up to 2, especially in the range of 0.1 to 0.5 mm and its thickness is 0.2 to 0.8 of its width.
13. A system according to claim 8, wherein the flat, narrow strip metal is a flattened wire.
14. A system according to any preceding claim, wherein the filter packing carries a layer catalytic for soot oxidation.
15. A system according to claim 14, wherein the filter comprises a catalytic coating comprising a washcoat including Pt or oxides of Cs and V.
16. A system according to any preceding claim, comprising means for generating ozone and/or a plasma for combusting soot collected on the filter.
17. An internal combustion engine comprising an exhaust system according to any preceding claim.

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AMENDED SHEET

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18. A diesel engine according to claim 17.